AMENDMENTS TO THE DRAWINGS:

Applicants are amending each of Figs. 7-9 to designate each figure by the legend "PRIOR ART". As indicated by the Examiner in Item 6 on page 3 of the Office Action mailed October 11, 2005, and in light of the description in the paragraph bridging pages 2 and 3 of Applicants' specification, clearly this amendment of the drawings does not add new matter to the application. Moreover, in light of this amendment to Figs. 7-9, it is respectfully submitted that the requirement for corrected drawings as set forth in Item 6 on page 3 of the Office Action mailed October 11, 2005, has been satisfied.

REMARKS

The requirement for correction of the drawings, as set forth in Item 6 on page 3 of the Office Action mailed October 11, 2005, is noted. This requirement has been satisfied, by the enclosed Replacement Sheets for Figs. 7-9, and the discussion in connection therewith in the section of this Amendment entitled "AMENDMENTS TO THE DRAWINGS".

The restriction requirement as set forth in Item 1 on page 2 of the Office Action mailed October 11, 2005, is noted. Pursuant to the requirement in Item 4 on page 3 of this Office Action mailed October 11, 2005, Applicants affirm their election of the Group I claims, that is, claims 1 and 2, directed to a friction stir welding method. As will be discussed infra, it is respectfully submitted that claims 1 and 2, as well as presently newly submitted claims 5-15, read on the elected invention. In light of this election, claims 3 and 4 of the enclosed claims list have been designated as "withdrawn" claims.

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended claim 2 to recite that each of the hollow shape members include projections formed at width-direction height end portions "of each" of the hollow shape members.

In addition, Applicants are adding new claims 5-15 to the application. Claim 5, dependent on claim1, recites that the plural members include at least three members, with the three members butting end portions so as to provide two butt joint portions between adjacent members of the three members, and with plate thicknesses of the adjacent members at one of the two butt joint portions being thinner than the plate thicknesses of the adjacent members at the other of the two butt joint portions, the three members having projections at the butt joint portions,

and the protruded height of the projections on the plates at the butt joint portion where the plate thickness is small is larger than the protruded height of the projections on the plates where the plate thickness is large. Note, for example, Fig. 1. See also the description in connection therewith, for example, on pages 7-9 of Applicants' specification. Note also, for example, Fig. 4 and description in connection therewith on pages 10-12 of Applicants' specification.

Claims 6 and 7, dependent respectively on claims 5 and 6, respectively recites that the projections extend above faces of the plates only at end portions of the plates; and recites that, of the three members, the first and third members sandwich the second member, the first and third members respectively having thicker and thinner plates, with the second member, adjacent the first member having a plate thickness equal to the plate thickness of the first member, and, adjacent the third member, having a plate thickness equal to the plate thickness of the third member. Note, for example, Fig. 1 of Applicants' original disclosure. Claim 8, dependent on claim 7, recites that the protruded height of the projections of the first and second members adjacent each other is the same, and the protruded height of the projections of the second and third members adjacent each other is the same, the protruded height of the projections of the first and second members adjacent each other being smaller than the protruded height of the projections of the second and third members adjacent each other. Note, for example, Fig. 1 of Applicants' original disclosure. Claims 9 and 10, each dependent on claim 5, respectively recites that the rotary tools are inserted simultaneously into the two butt joint portions and perform simultaneously to the two butt portions the friction stir welding; and recites that the rotary tools are inserted in sequence into the two butt joint portions, and the friction stir welding is performed on the two butt joint portions in

sequence. Note, for example, the third full paragraph on page 9 of Applicants' specification. Claim 11, dependent on claim 5, recites that total thicknesses of the plates and projections at each of the end portions of the first, second and third members are the same. Note, for example, the third full paragraph on page 7 of Applicants' specification.

Claims 12 and 13, each dependent on claim 1, respectively recites that the projections extend only at the end portions of the plates; and recites that total thicknesses of the plates and projections at each of the end portions are the same. Claims 14 and 15, each dependent on claim 1, respectively recites that the rotary tools are inserted simultaneously into the butt joint portions so as to simultaneously perform the friction stir welding; and recites that the rotary tools are inserted in sequence into the butt joint portions so as to perform the friction stir welding in sequence.

Applicants respectfully traverse the rejection of claim 1 under the second paragraph of 35 USC 112, as being indefinite, particularly in view of the following. Thus, the Examiner contends that claim 1 is indefinite in that the paragraph "inserting rotary tools . . . " recited in claim 1 is unclear as to whether the plural members are joined at the abutted projection portions simultaneously or sequentially using rotary tools of the same size. As is clear from Applicants' specification, and as is particularly clear from, for example, claims 9, 10, 14 and 15, claim 1 is generic with respect to simultaneously or sequentially using the rotary tools. That is, claim 1 is generic to performing the friction stir welding simultaneously and performing the friction stir welding in sequence. It is respectfully submitted that the recitation as to inserting the rotary tools and performing the friction stir welding as in claim 1, sufficiently defines the metes and bounds of the present invention such that one of

ordinary skill in the art would have known whether any specific processing performed fell within or outside the present claims. Under the present circumstances, the second paragraph of 35 USC 112 requires nothing more. See In re Moore, 169 USPQ 236 (CCPA 1971).

Applicants respectfully submit that all of the claims now presented for consideration by the Examiner patentably distinguish over the teachings of the prior art applied by the Examiner in rejecting claims in the Office Action mailed October 11, 2005, that is, the description in connection with Figs. 7-9 in Applicants' original disclosure (which the Examiner has characterized as Applicants' admitted prior art (AAPA)), and Japanese Patent Document No. 2002-224858 (Koichi, et al.), under the provisions of 35 USC 102 and 35 USC 103.

It is respectfully submitted that this prior art as applied by the Examiner would have neither taught nor would have suggested such a friction stir welding method as in the present claims, including the preparation of plural members each having projections at end portions of a plate, the projections protruding toward a direction of thickness of the plate; wherein the thickness of the plate of at least one member is different from the thickness of the plate of another member, and wherein the protruded height of the projections on the plates at a butt joint portion where the plate thickness is large is smaller than the protruded height of the projections on the plates at a butt joint portion where the plate thickness is small, the protruded height of the projections on the plates at a butt joint portion where the plate thickness is small is larger than the protruded height of the projections on the plates where the plate thickness is large, rotary tools of the same size being inserted with the same insertion depth to the plates and friction stir welding being performed. See claim 1.

In addition, it is respectfully submitted that the applied prior art would have

neither taught nor would have suggested such friction stir welding method as in the present claims, having features as discussed previously, and, moreover, wherein the members are hollow shape members, having, inter alia, two substantially parallel face plates and projections formed at width-direction-end portions of each of the hollow shape members. See claim 2.

Furthermore, it is respectfully submitted that the prior art as applied by the Examiner would have neither taught nor would have suggested such friction stir welding method as in the present claims, having features as discussed previously in connection with claim 1, and, moreover, wherein the plural members include at least three members, the middle member thereof providing butt joint portions with the adjacent sandwiching members, with plate thicknesses of the adjacent members at one of the two butt joint potions being thinner than the plate thicknesses of adjacent members at the other of the two butt joint portions, protruded height of the projections on the plates at the butt joint portion where the plate thickness is small being larger than the protruded height of the projections on the plates where the plate thickness is large. See claim 5.

In addition, it is respectfully submitted that the applied prior art would have neither taught nor would have suggested such friction stir welding method as in the present claims, having features as in claims 1 and/or 5 as discussed previously, and, moreover, wherein the projections extend above faces of the plates only at end portions of the plates (see claim 6; note also claim 12); and/or total thicknesses of the plates and projections at each of the end portions are the same (note claims 11 and 13); and/or wherein the rotary tools are inserted simultaneously (note claims 9 and 14) or in sequence (note claims 10 and 15) into the butt joint portions so as to simultaneously or in sequence perform the friction stir welding.

Furthermore, it is respectfully submitted that the disclosures of the applied prior art would have neither taught nor would have suggested the friction stir welding method as in the present claims, wherein the second member has a plate thickness equal to the plate thickness of the first member, adjacent the first member, and has a plate thickness equal to the plate thickness of the third member, adjacent the third member. See claim 7.

The invention as claimed in the above-identified application is directed to a friction stir welding method. In various previously known friction stir welding techniques, projections that protrude in the thickness direction of a plate-shaped member are formed to the ends of the member, with a rotary tool being inserted into, inter alia, the projections so that when a gap exists in the butted portion between two members being friction stir welded, the gap can be filled with the metal material constituting the projections.

A problem arises, however, in friction stir welding wherein the thickness of the plate members being friction stir welded varies at different locations. Conventionally, since the height of the small diameter portion of the rotary tool must be substantially equal to the thickness of the plate member being welded, rotary tools having different sizes must be used appropriately to correspond to various welding areas when various locations have different thicknesses, which makes handling and management of the rotary tools troublesome.

Against this background, Applicants provide a method which avoids problems arising when members having different plate thicknesses are used. Applicants have found that by providing the projections with different thicknesses, thicknesses of the projections being greater where the plate thicknesses are thinner and being smaller where the plate thicknesses are greater, a same size rotary tool can be used and

inserted to the same insertion depth irrespective of different thicknesses of the plates. In this regard, note, for example, Figs. 2 and 3; and, for example, the paragraph bridging pages 7 and 8, the sole full paragraph on page 8, the paragraph bridging pages 8 and 9, and the first full paragraph on page 9, of Applicants' specification.

As can be seen in Figs. 7-9 of Applicants' original disclosure, the structure of adjacent plates being friction stir welded, with thicknesses of the plates at the locations of the friction stir welding being different at different locatoins, is known. However, it is respectfully submitted that, as described in Applicants' original disclosure, it was not previously known to provide protrusions having different heights, much less the relative heights of the protrusions where the plate thicknesses are relatively thick and are relatively thin, as in the present claims, and advantages thereof.

It is respectfully submitted that the teachings of Koichi, et al. would not have rectified the deficiencies of the described previously known technique as seen in Figs. 7-9 of Applicants' original disclosure, such that Applicants' claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Koichi, et al. discloses a joining method for forming a joint between members having different thicknesses. Specifically, an aluminum alloy plate 1 and an aluminum alloy plate 2 are provided by butting on a surface (backing or support) plate 3 in which a difference in level is provided. A height of the difference in level in surface plate 3 is designed so as to coincide to a difference in plate thicknesses between the aluminum alloy plates 1 and 2, such that upper surfaces of the aluminum alloy plates 1 and 2 form a substantially planar surface. Thereafter, a tool 10 for friction stir welding is rotationally press fitted into a place which is shifted to

the aluminum alloy plate 1 side (the thicker plate side) from the butting part of both aluminum alloy plates, and friction stir welding is performed so that it traverses the aluminum alloy plates 1 and 2.

Initially, it is emphasized that Koichi discloses members of different thicknesses at a joint portion, being friction stir welded at the joint portion. The disclosed structure being friction stir welded does not have projections as in the present claims. It is respectfully submitted that the disclosure of Koichi, et al., even together with prior techniques as disclosed in Applicants' original disclosure, would have neither taught nor would have suggested the method using members with projections having the relative heights as in the present claims, and advantages thereof.

To emphasize, it is noted that in Koichi, et al., differences in thickness of the plates being welded, at the location of the weld, is compensated for by surface (support) plate 3, which constitutes a support for the plates which are being friction stir welded. Such disclosure of compensating for the difference in thicknesses of the plates being welded, at the weld, would have neither taught nor would have suggested the present invention, including the relative thicknesses of the projections, which participate in the friction stir welding, and advantages thereof.

Moreover, it is emphasized that according to Koichi, et al., the plates being welded have different thicknesses at the joint at which the welding takes place. Compare with, for example, various aspects of the present invention, wherein plate thicknesses of adjacent plates at a butt joint portion are the same, but such plate thicknesses at one butt joint portion are different from plate thicknesses at another butt joint portion (compare plate thicknesses at butt joint portion A in Fig. 1, with plate thicknesses at butt joint portion B in Fig. 1).

The Examiner notes that Koichi, et al. teaches a friction stir welding method of joining members of different thickness, including use of a surface plate (3) with different level heights such that level height on the plates at a butt joint portion where the plate thickness is large is smaller than level height on the plate where the plate thickness is small. However, it must be emphasized that according to Koichi, et al., the plate 3 in Koichi, et al. is a support plate, and does not participate in the friction stir welding. Clearly, Koichi, et al., as applied by the Examiner, would have neither taught nor would have suggested the projections and relative heights thereof, as in the present claims, and advantages thereof; and/or the other features of the present invention, as discussed previously, and advantages thereof.

In view of the foregoing comments and amendments, reconsideration and allowance of all the claims presently in the application are respectfully requested.

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Respectfully submitted,

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Enclosures: Replacement Drawings (2 pp., Figs. 7-9)

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